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(54) **DEPLOYING SECURE NEIGHBOR DISCOVERY IN EVPN**

(57) Techniques are described for providing security extensions to neighbor discovery in Ethernet Virtual Private Network (EVPN). For example, a network device that implements Ethernet Virtual Private Network (EVPN) receives a neighbor discovery response message including a nonce originated by a second network device and

not originated by the first network device. The network device processes the neighbor discovery response message including the nonce originated by the second network device and not originated by the first network device.

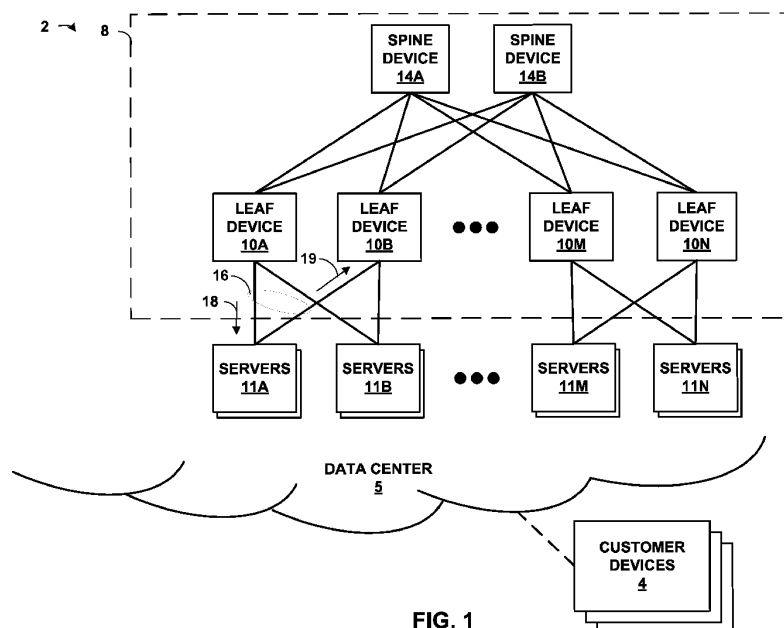


FIG. 1



EUROPEAN SEARCH REPORT

Application Number

EP 24 20 3975

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	RABADAN J ET AL: "Operational Aspects of Proxy-ARP/ND in EVPN Networks; draft-snr-bess-evpn-proxy-arp-nd-02.txt", OPERATIONAL ASPECTS OF PROXY-ARP/ND IN EVPN NETWORKS; DRAFT-SNR-BESS-EVPN-PROXY-ARP-ND-02.TXT, INTERNET ENGINEERING TASK FORCE, IETF; STANDARDWORKINGDRAFT, INTERNET SOCIETY (ISOC) 4, RUE DES FALAISES CH- 1205 GENEVA, SWITZERLAND, 6 October 2015 (2015-10-06), pages 1-22, XP015108735, * abstract, sections 2, 4, 5.3.3, 5.3.4.1 *	1-12	INV. H04L45/02 H04L45/24 H04L45/00 H04L45/50 H04L45/58 H04L47/125 H04L9/40 H04L12/46
A	ARKKO J ET AL: "SEcure Neighbor Discovery (SEND); rfc3971.txt", SECURE NEIGHBOR DISCOVERY (SEND)?; RFC3971.TXT, INTERNET ENGINEERING TASK FORCE, IETF; STANDARD, INTERNET SOCIETY (ISOC) 4, RUE DES FALAISES CH- 1205 GENEVA, SWITZERLAND, 1 March 2005 (2005-03-01), XP015009743, * sections 5.3.2-5.4.4 *	1-12	TECHNICAL FIELDS SEARCHED (IPC) H04L
-The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		4 November 2024	Agudo Cortada, E
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		& : member of the same patent family, corresponding document	

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EUROPEAN SEARCH REPORT

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EP 24 20 3975

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	PATEL ARRCUS A SAJASSI CISCO J DRAKE Z ZHANG JUNIPER NETWORKS W HENDERICKX NOKIA K: "Virtual Hub-and-Spoke in BGP EVPNs; draft-ietf-bess-evpn-virtual-hub-00.txt", VIRTUAL HUB-AND-SPOKE IN BGP EVPNs; DRAFT-IETF-BESS-EVPN-VIRTUAL-HUB-00.TXT; INTERNET-DRAFT: BESS WORKING GROUP, INTERNET ENGINEERING TASK FORCE, IETF; STANDARDWORKINGDRAFT, INTERNET SOCIETY (ISOC) 4, , 28 September 2019 (2019-09-28), pages 1-17, XP015137474, Retrieved from the Internet: URL:https://tools.ietf.org/html/draft-ietf-bess-evpn-virtual-hub-00 [retrieved on 2019-09-28] * * sections 3 and 5.3 " * -----	1-12	
A	Anonymous: "Example: Configuring an EVPN-VXLAN Edge-Routed Bridging Overlay Within a Data Center - TechLibrary - Juniper Networks", , 10 April 2019 (2019-04-10), XP055735182, Retrieved from the Internet: URL:https://www.juniper.net/documentation/en_US/junos/topics/example/evpn-vxlan-collapsed-topology.html [retrieved on 2020-09-29] * page 1, last paragraph * -----	1-12	TECHNICAL FIELDS SEARCHED (IPC)
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EPO FORM 1503 03.82 (P04C01)



Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1 - 12

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 24 20 3975

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-12

forwarding a neighbor discovery response message by a first network device to a second network device, both of which are coupled to a host device by a multi-homed intermediate network device by an Ethernet segment to the second network device when the response message specifies a physical IP address of the second network device

2. claims: 13-15

intercepting a first neighbor discovery response message not meant to the first network device, store the nonce therein contained and dropping the message, generating a neighbor discovery request message with the same nonce and obtain link layer addresses learned from the corresponding response message
